

Multi-Objective Analysis for Jointly Reducing Noise and Emissions via ATM/Aircraft Systems, Phase I

Completed Technology Project (2006 - 2006)



Project Introduction

Leveraging extensive experience from Joint Planning and Development Office (JPDO) environmental analysis, Federal Aviation Administration (FAA) National Airspace Re-design projects, as well as National Aeronautics and Space Administration (NASA) environmental modeling and decision-aid projects, Metron Aviation develops a software system to enable balanced noise and emissions reductions by integrated Air Traffic Management (ATM)/aircraft systems. The proposed capability, Emissions and Noise Total Impact REduction (ENTIRE) is innovative in the follow ways: 1. It spans the spectrum of environmental impacts, encompassing both noise and local air-quality; 2. It conjoins both ATM and aircraft-based activities for the management of these impact; and 3. It provides a tractable algorithmic approach to achieving specific noise and emissions impact reduction goals. The proposed capability directly supports the next-generation capabilities and environmentally friendly ATM capability sought under Small Business Innovative Research (SBIR) Subtopic A3.01 ? Next Generation ATM Systems, directly addressing integrated ATM/aircraft systems that reduce noise and emissions. This software system enables NASA to provide quantitative techniques for finding ATM/aircraft operations that achieve specific combined noise and emissions impact reductions using methods that identify relative contributions of each aspect of ATM and aircraft operations to these reductions. At its core the system will utilize greedy/breedy algorithms with variance in degrees of freedom and comparison of subsequent solutions towards meeting specific impact reduction goals.

Anticipated Benefits

Potential NASA Commercial Applications: The Phase I and Phase II non-NASA commercial potential for the ENTIRE method and supporting algorithms is significant in the following ways: ? Aviation-related commercial firms of all types (airlines, aerospace companies, consultants, etc.) need access to a methodology and algorithms that will help them plan and execute optimal mixtures of ATM and aircraft operational activities to reduce environmental impacts associated with aviation noise and emissions; and ? The long-term nature of the JPDO development of the Next Generation Air Transportation System (NGATS) implies that the changing nature of the business strategies of NAS users will require continued adjustment in the ATM/aircraft operational activities, perhaps in a tactical fashion. This will provide commercial opportunities for firms able to rapidly ingest large amounts of complex demand, capacity, and weather information, analyze this information, and produce optimal operational-activity plans.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

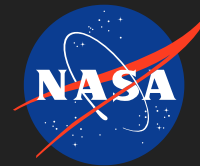
Ames Research Center (ARC)

Responsible Program:

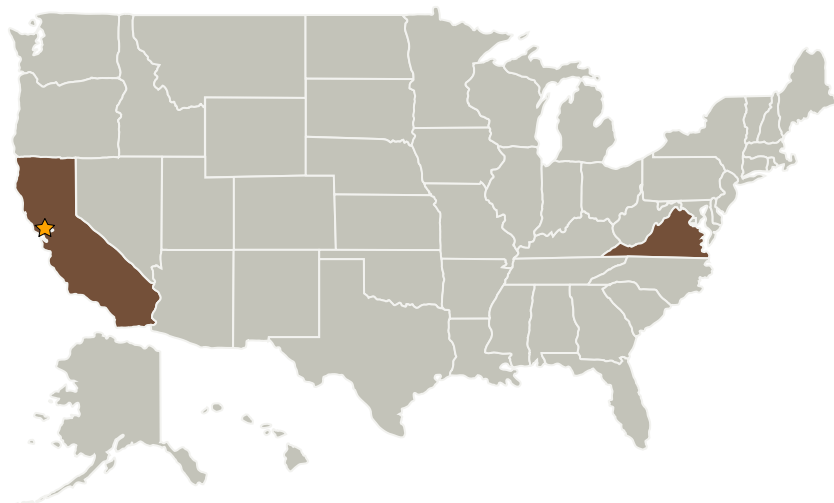
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Metron Aviation, Inc.	Supporting Organization	Industry	Dulles, Virginia

Primary U.S. Work Locations

California	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Terence R Thompson

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies